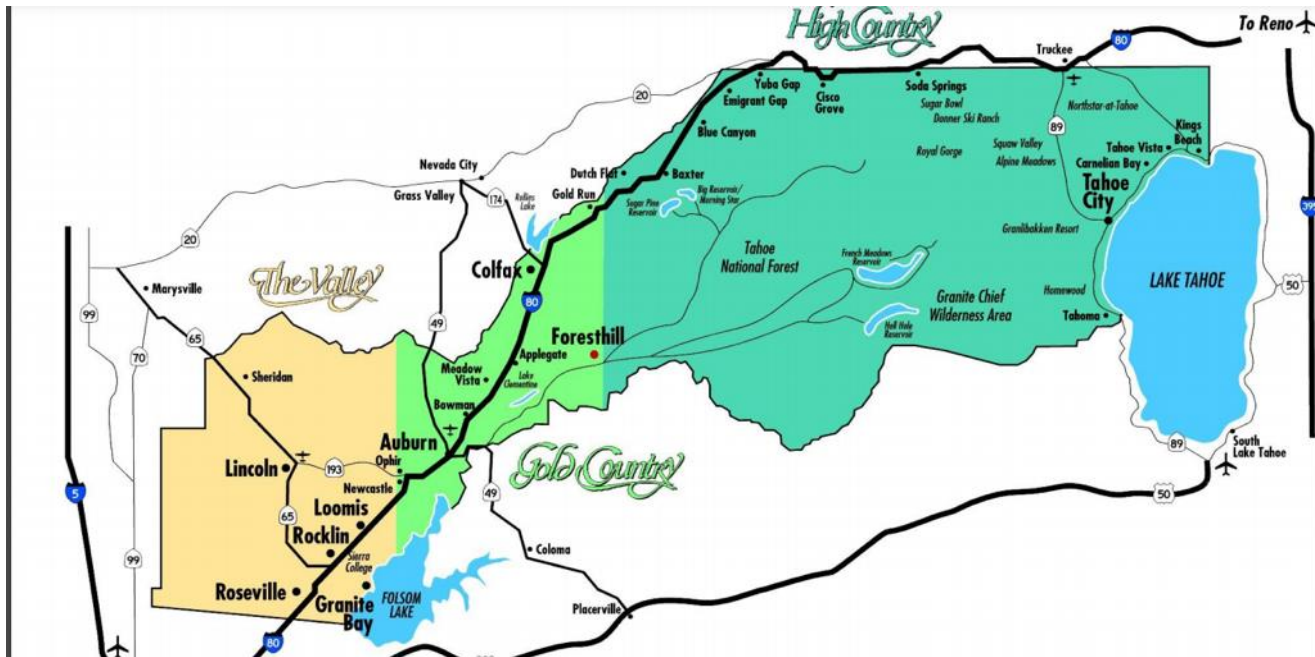


Seroepidemiology Survey of Placer County

October 25, 2020 – March 15, 2021

Julie Parsonnet, MD. Stanford University



Overview of presentation

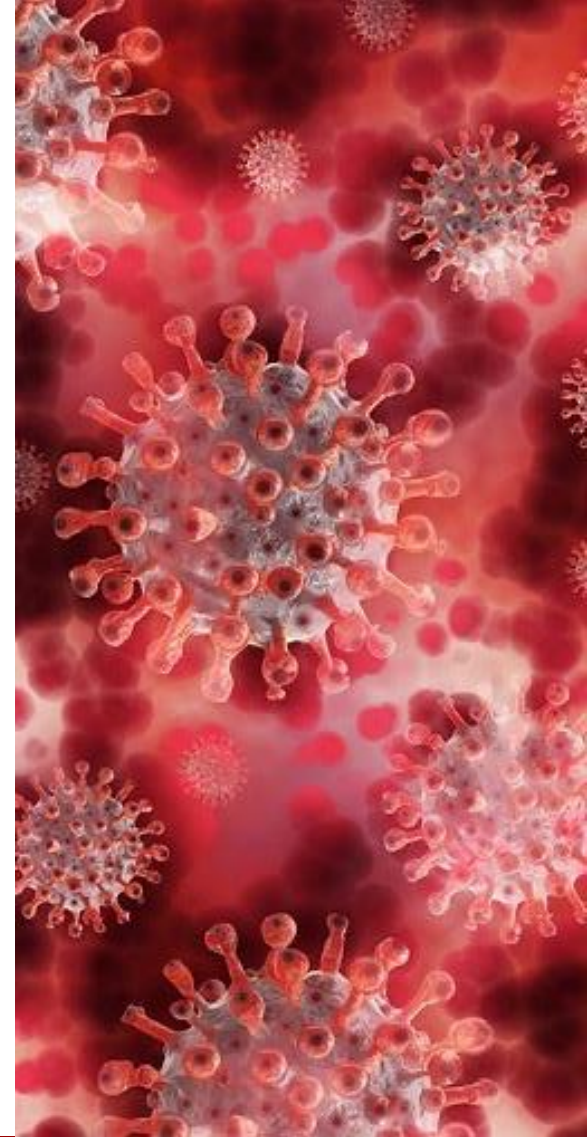
- 1 Background
- 2 Methods
- 3 Results
- 4 Interpretation
- 5 Thoughts moving forward

Background

- May, 2020: approached by the county
- Sept 22: contract signed with aim

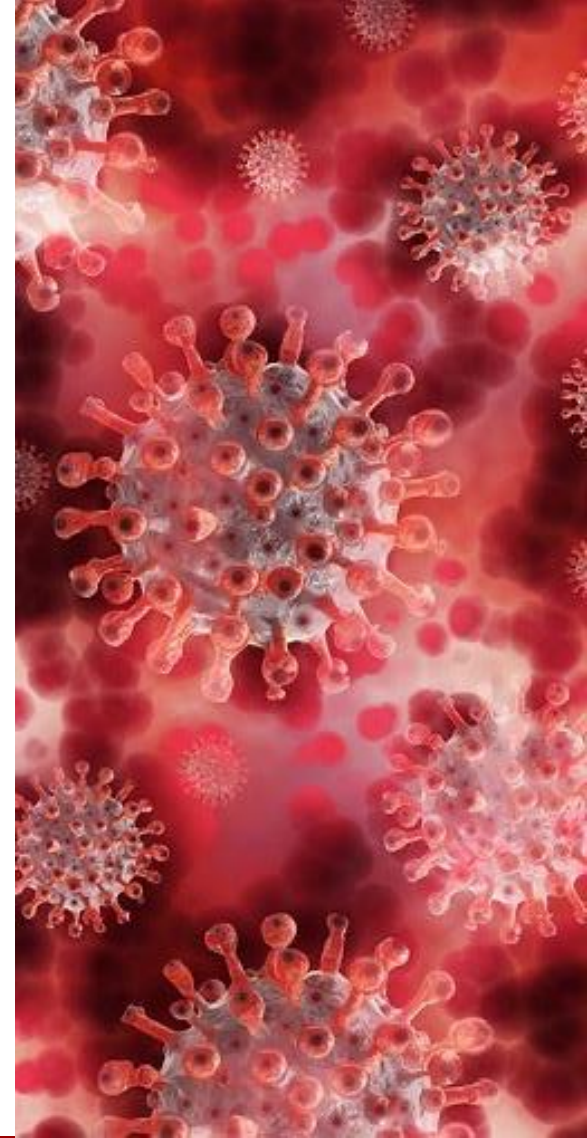
To estimate the seroprevalence of SARS-CoV-2 in Placer County extrapolating from a representative sample of 2,000 individuals

- Mailings
 - Oct 25: 5,000 addresses
 - Nov 25: 10,000 addresses
 - Feb 4: 5,000 addresses
- March 15: Data closed



What and why

- To see, in an unbiased way, who has been infected and what populations are at risk
- To estimate asymptomatic infection rate
- To estimate infection fatality rate (IFR):
number of deaths divided by all cases
- To determine where vaccinations might have the greatest impact
- After vaccinations start, to see their impact on population immunity

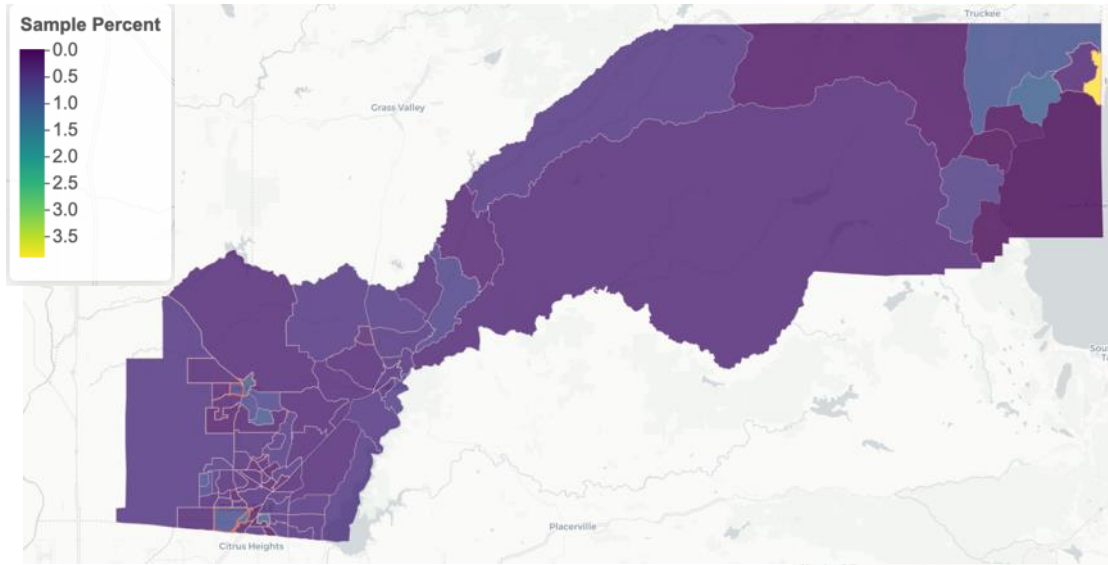


Whom did we contact

Step	Mailing One 15Oct-25Nov	Mailing Two 25Nov-4Feb	Mailing Three 4Feb-3Mar	Total
Households mailed	4990	9979	4999	19968
Responding households	471 (9.4%)	915 (9.2%)	219 (4.4%)	1605 (8.0%)
Volunteers providing a blood spot	603	1200	273	2076
Volunteers providing a blood spot and a questionnaire	588	1,181	266	2035

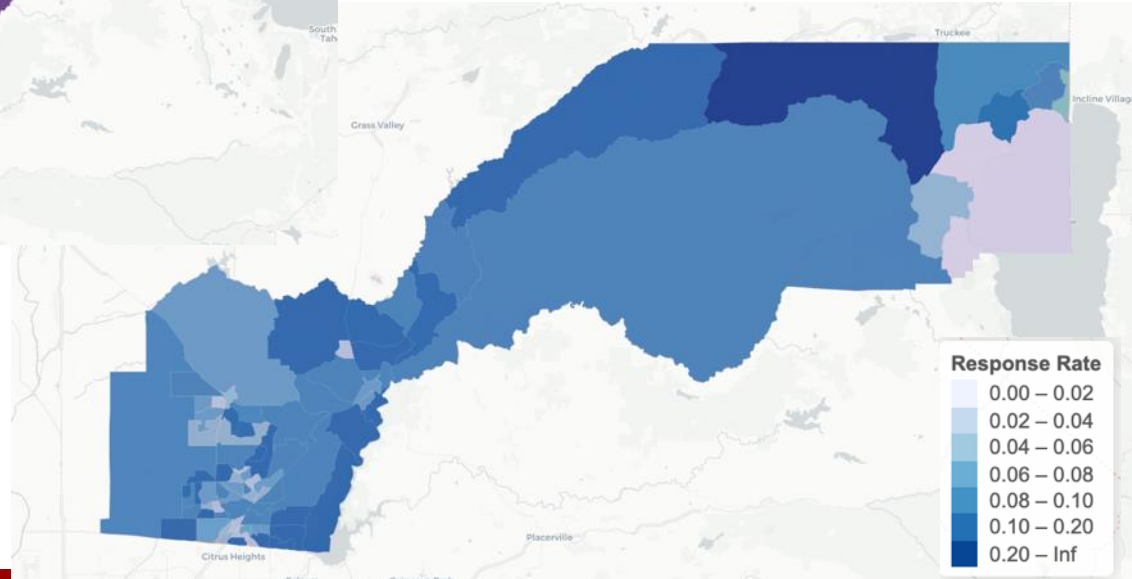
Children were excluded from the study

Whom did we reach?



Distribution across county

Response rate per census tract



Representativeness of sample

		CENSUS	SAMPLE	N SAMPLE
Age 65+		19.9	27.8	565
Female		51.2	52.9	1077
Race	Black/African American	1.9	0.6	10
	Asian	8.2	3.9	70
	Native American/PI	1.4	1.4	25
	White	83.9	87.6	1585
	Mixed	4.6	5.4	98
Hispanic/LatinX		14.4	9	167
Non-White, Hispanic		71.5	81.8	1477
Foreign Born		11.4	12.2	239
Education	HS+	94.5	96	1661
	BA+	39.7	61.6	1066

South Placer	Population	Sent	Blood spot	N (%) positive
Granite Bay	22,439	890	149	12 (8)
Lincoln	46,939	3988	265	16 (6)
Loomis	6,753	502	53	6 (11)
Penryn	925	100	4	2 (50)
Rocklin	63,127	2767	261	14 (5)
Roseville	133,049	7666	708	29 (4)

Mid Placer	Population	Sent	Blood spot	N (%) positive
Applegate	1,033	55	10	0 (0)
Auburn	13,946	2025	224	5 (2)
Colfax	2,029	308	40	2 (5)
Foresthill	1,546	226	19	2 (10)
Meadow Vista	3,460	178	21	2 (10)
Newcastle	1,167	261	29	1 (3)
Weimar	209	69	7	0 (0)

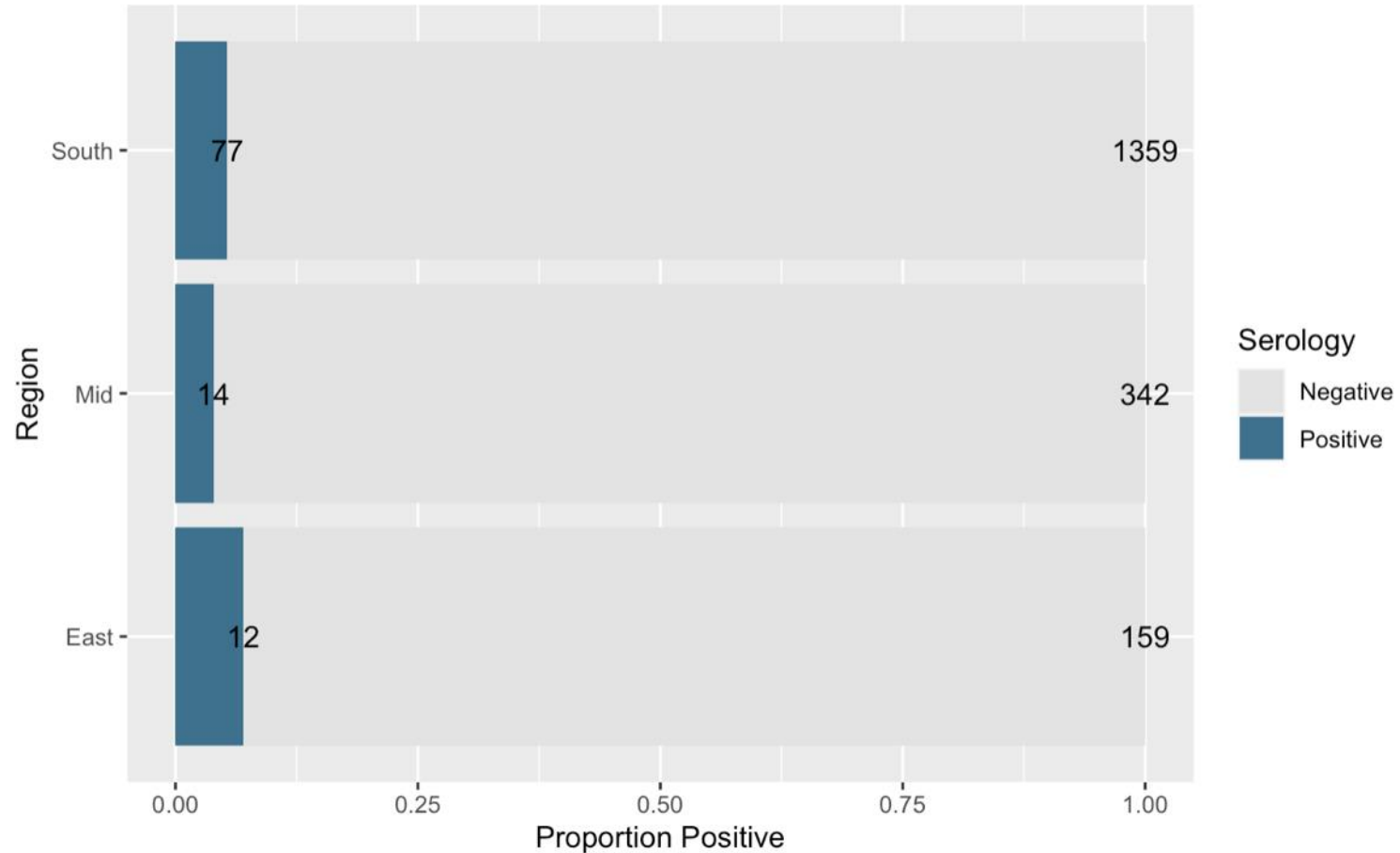
Seropositivity by city*

East Placer	Population	Sent	Blood spot	N (%) positive
Alta	485	49	2	0 (0)
Carnelian Bay	463	93	8	0 (0)
Dutch Flat	196	20	3	1 (33)
Homewood	200	64	3	1 (33)
Kings Beach	2,833	1457	117	7 (6)
Norden	27	7	2	2 (100)
Tahoe Vista	1,288	47	7	0 (0)
Truckee	16,377**	149	19	1 (5)

*Includes entire period, vaccinated and unvaccinated

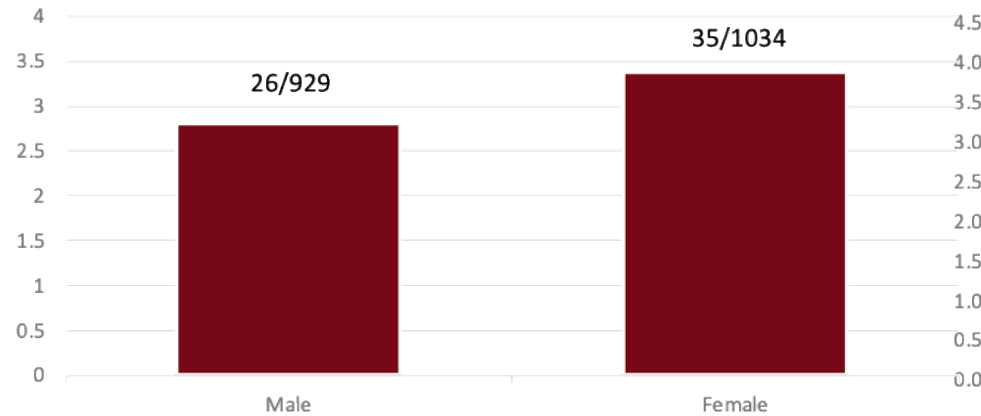
**Most not in Placer County

Who has positive serology and where?

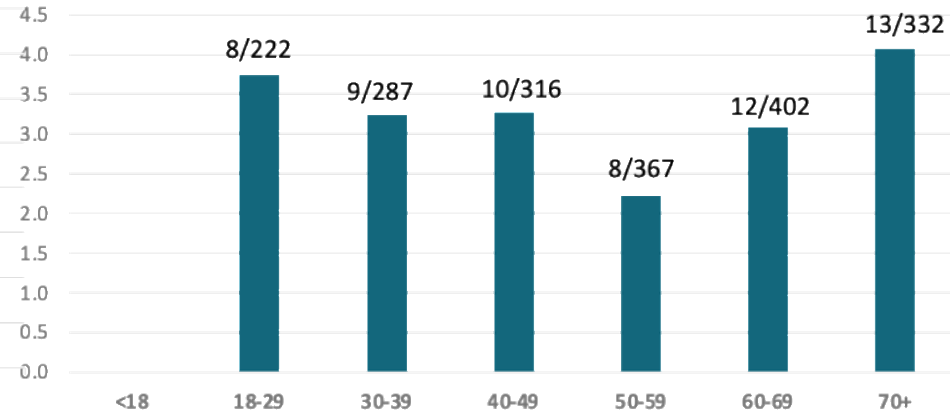


Who has been infected?*

Seropositivity rate by sex
among unvaccinated



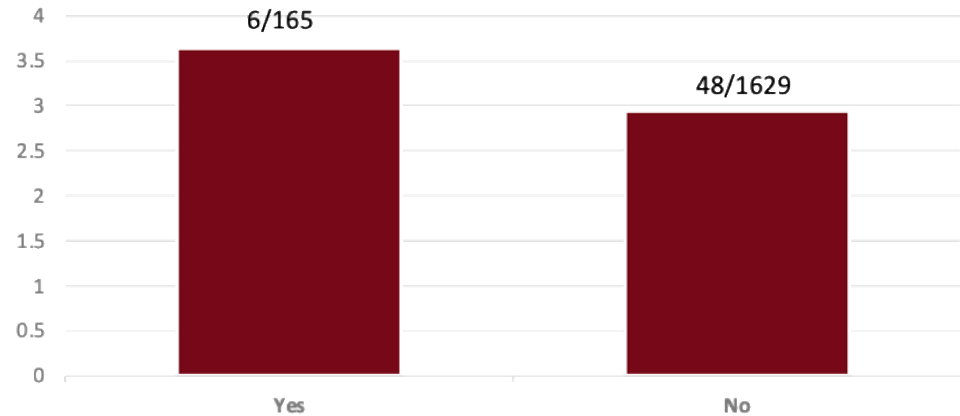
Seropositivity by age group
among unvaccinated



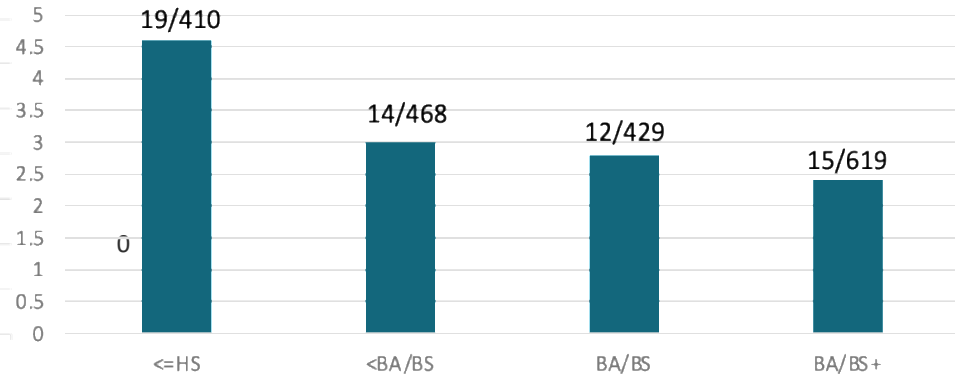
**Does not include vaccinated*

Who has been infected*?

Seropositivity rate by Hispanic ethnicity
among unvaccinated

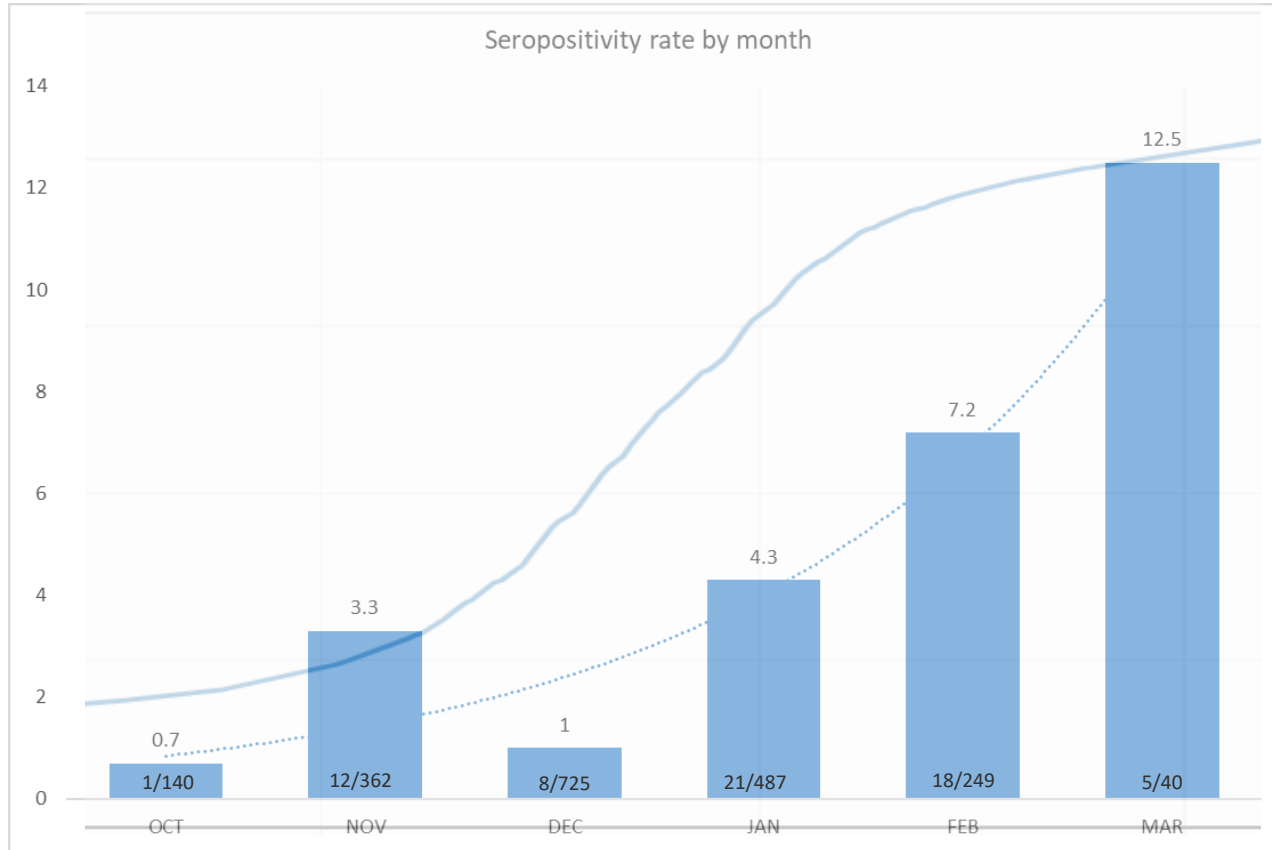


Seropositivity rate by education level
(among non-vaccinated)
Age ≥ 18



**Does not include vaccinated*

When did people become infected?



Unreported infection rate

- By March 1, Placer had reported 19,861 cases of COVID
- In March, we found 12.5% seropositivity, indicating 49,791 cases had occurred
- Adjusting for test, 15.6% seroprevalence, indicating, 62,139 cases had occurred

68% of cases unreported

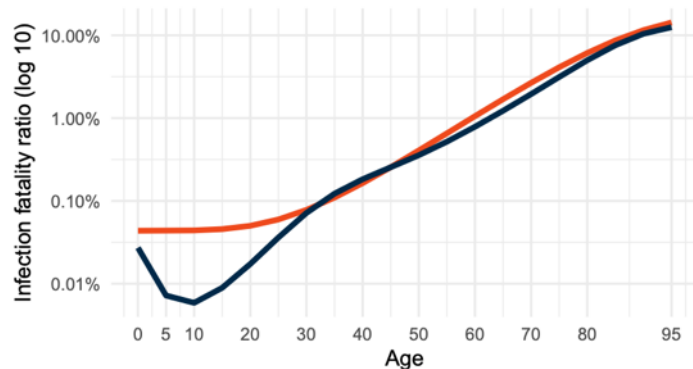
National level data: July 2020 = 86% under-reporting

January 2021 = 78% under-reporting

Infection fatality rate

- By March 1, Placer had reported 232 deaths from COVID
- Given 62,139 expected cases, infection-fatality rate is

0.37% infection fatality rate

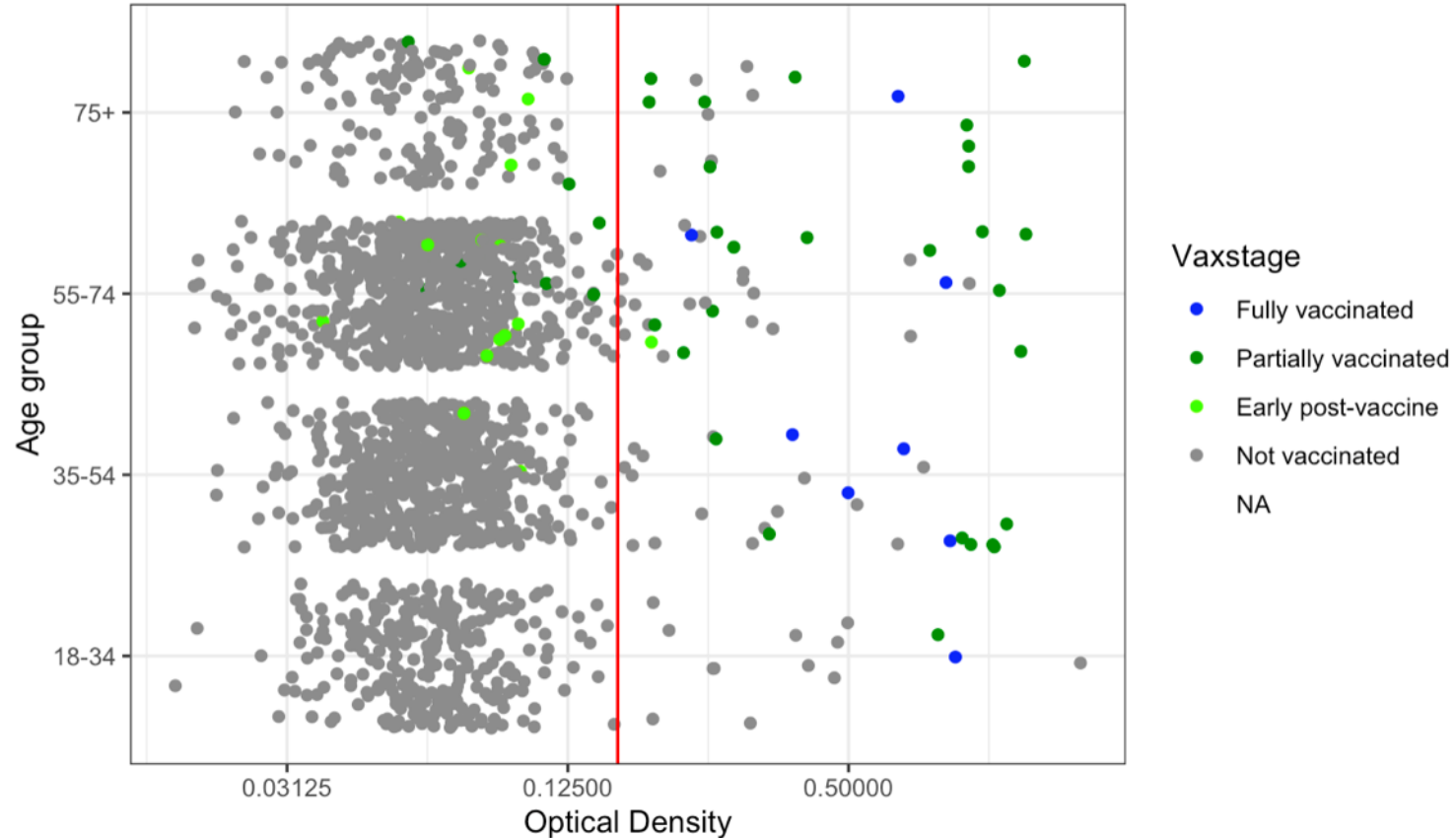


0.65 US (September)

0.58%, Sweden (December)

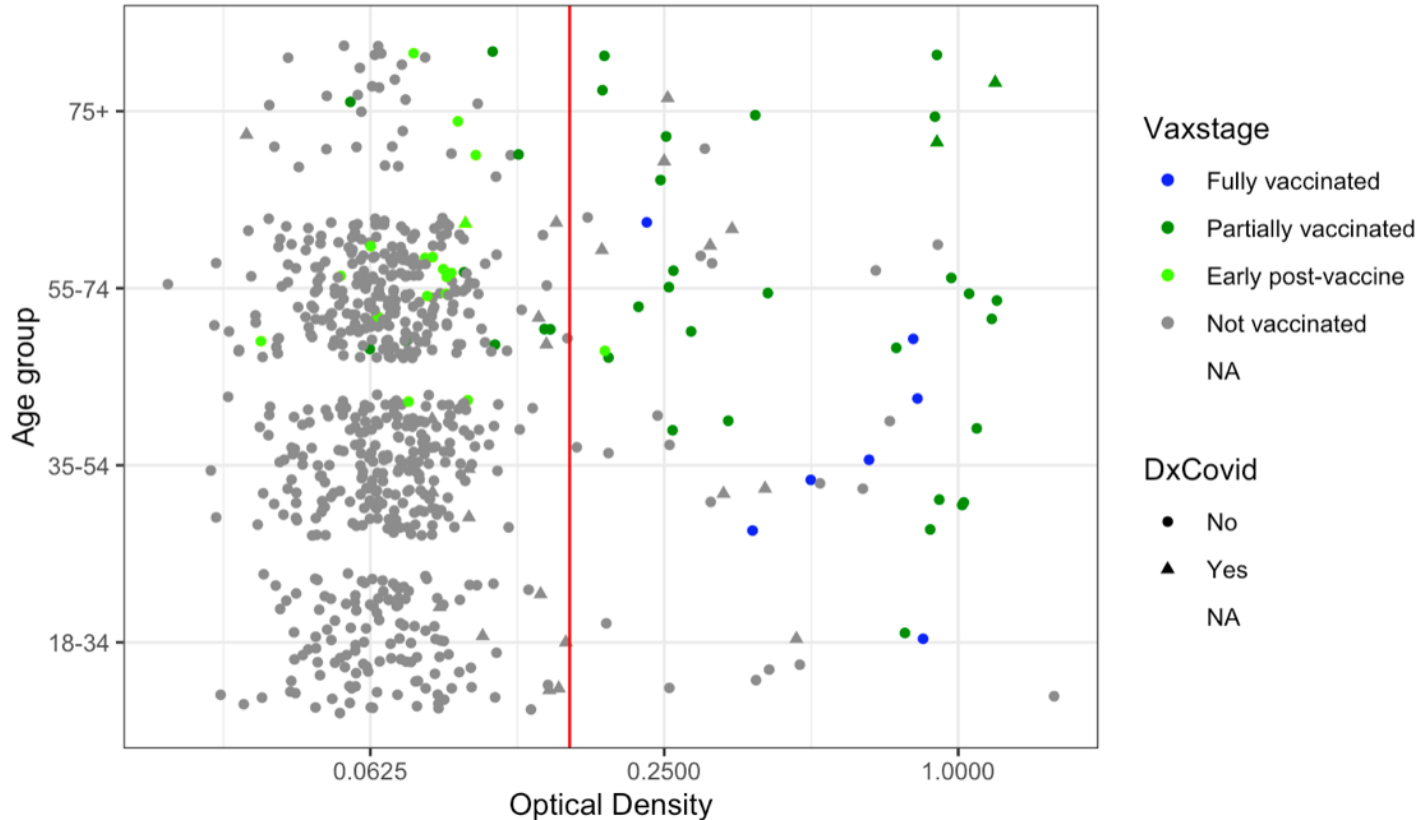
Who has antibodies against COVID?

Serology results by age group and vaccination status



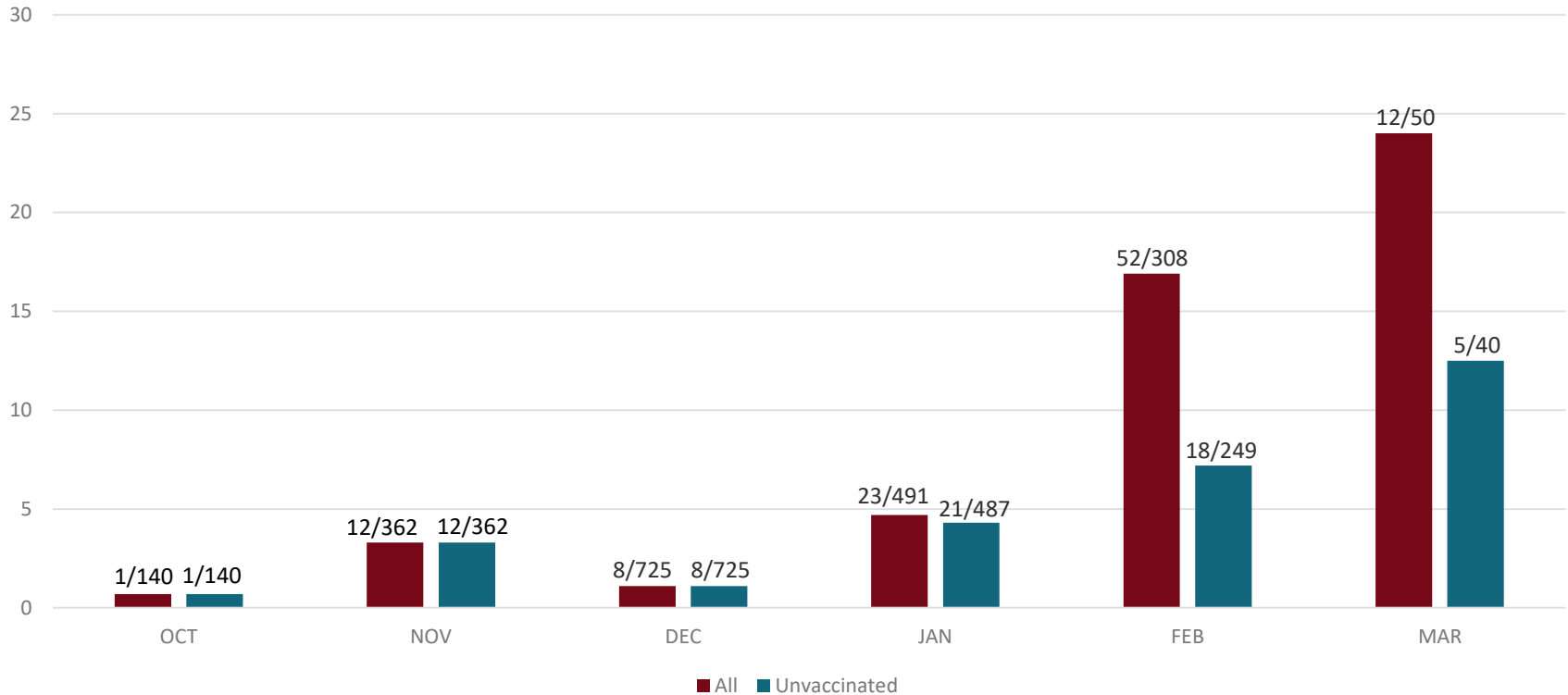
Who has antibodies against COVID since the surge?

Serology results by age group and vaccination status, 2021

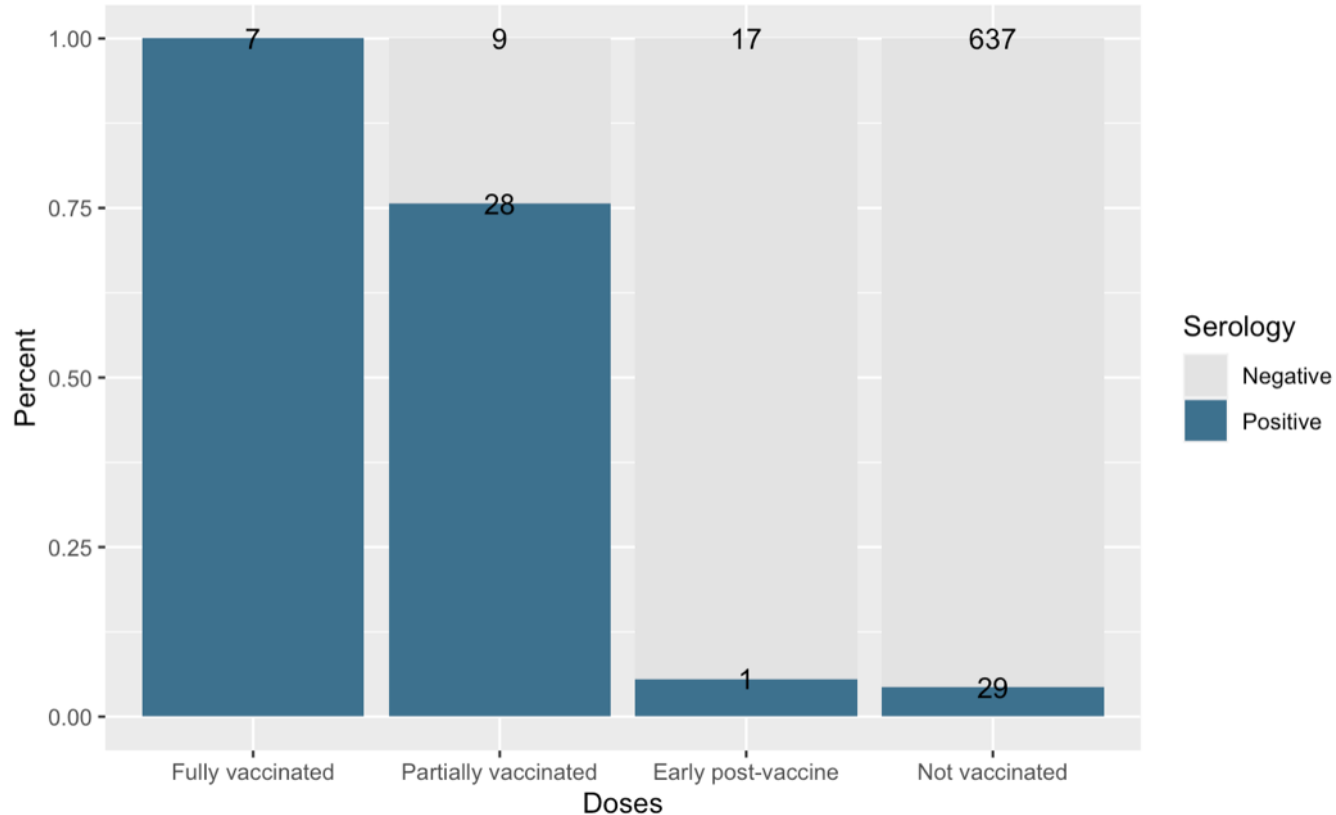


N=776

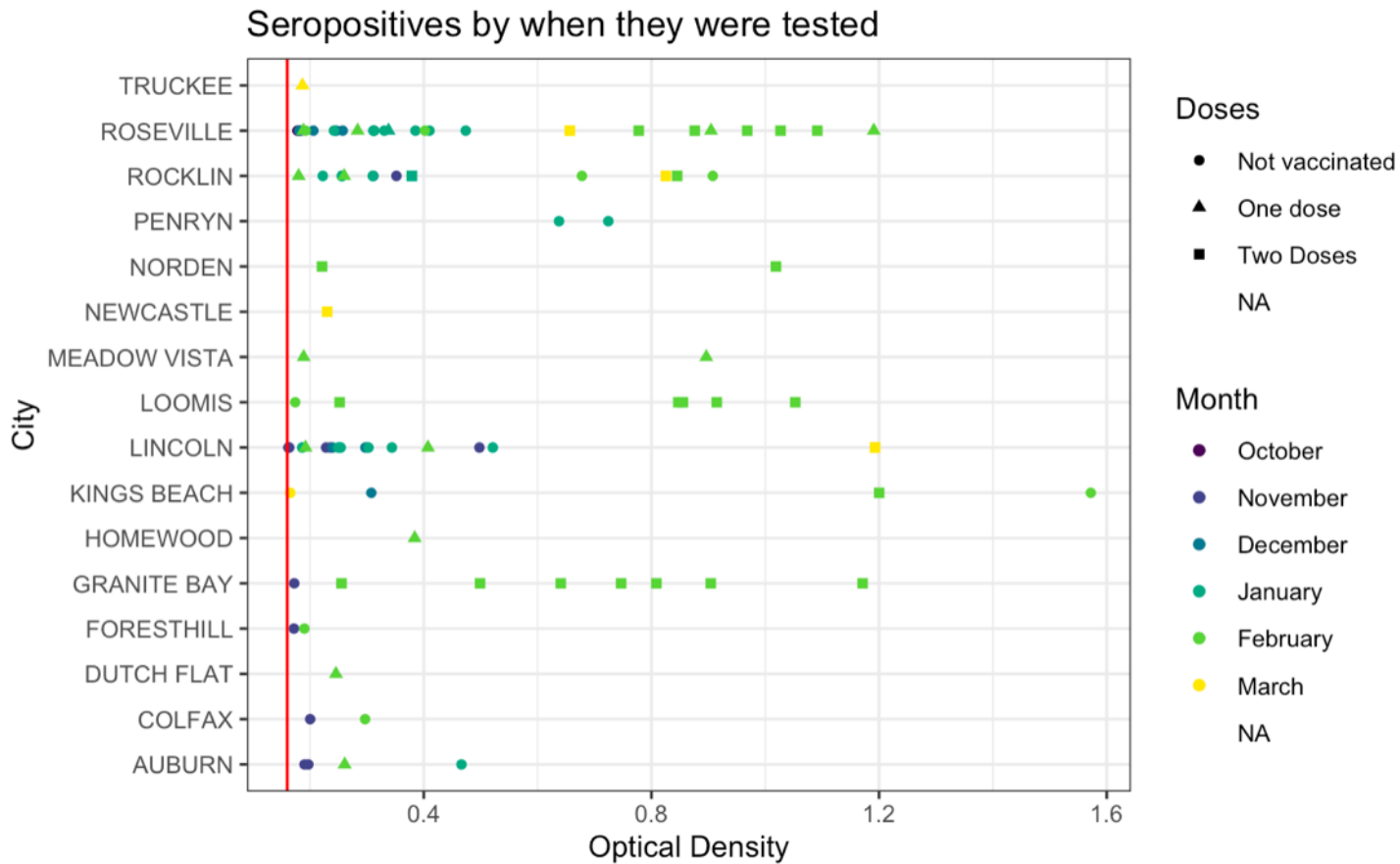
Increase in seropositivity due to vaccination



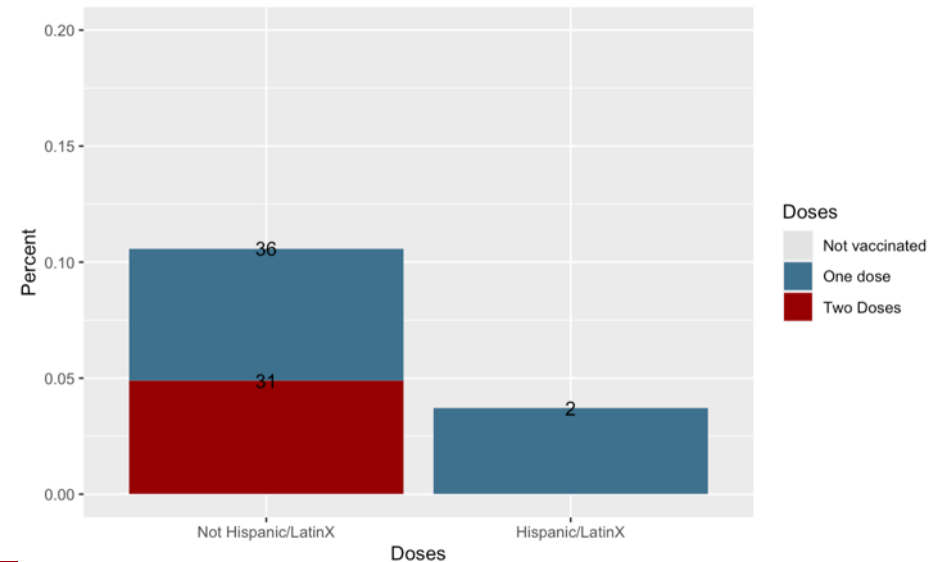
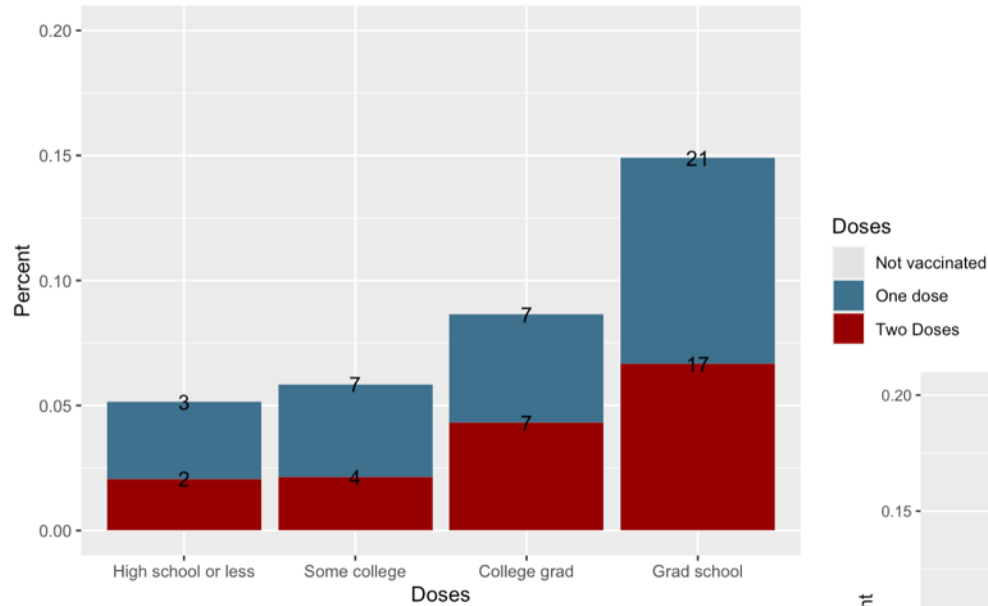
Serostatus by vaccine doses, 2021



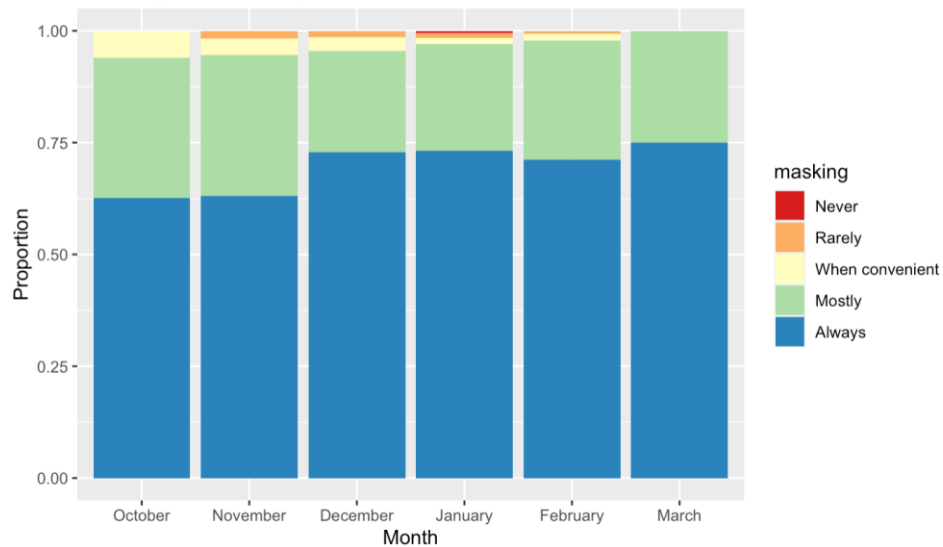
When and how did people become seropositive?



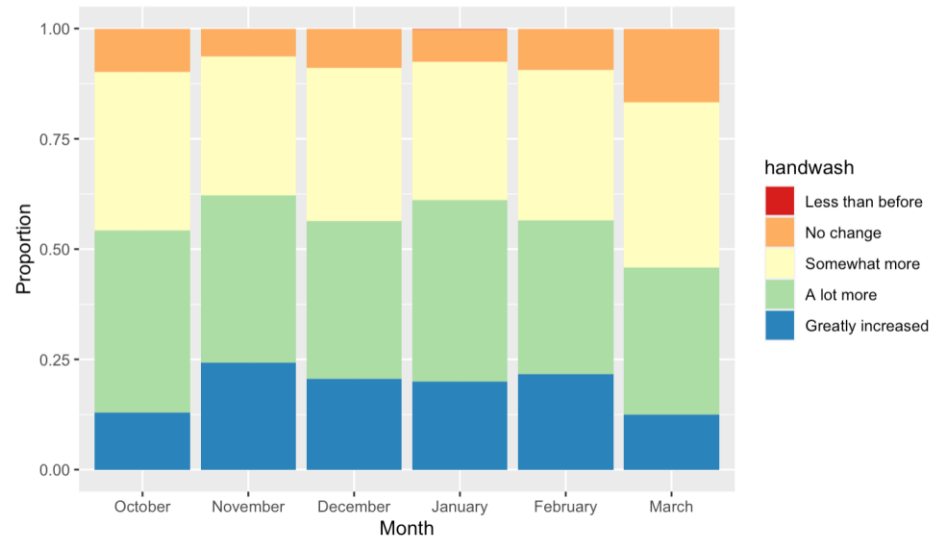
Vaccination by education strata



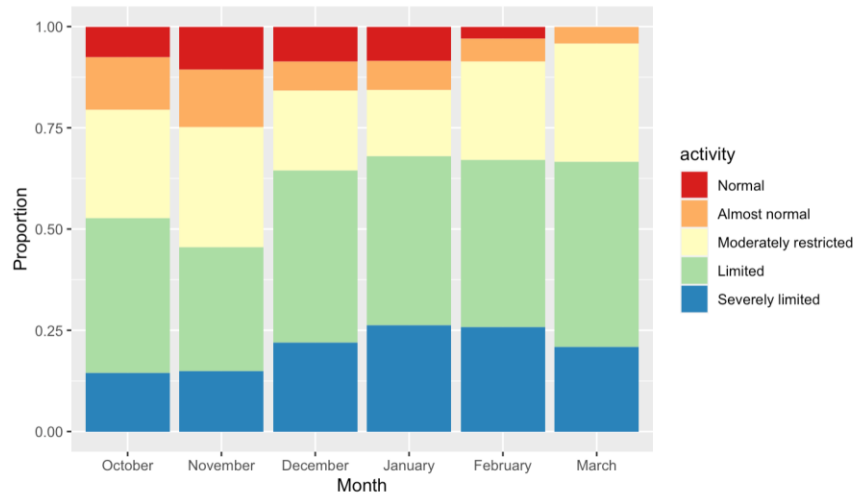
Masking behaviors by month



Handwashing behaviors by month



Activity behaviors by month



Behaviors by
month

Interpretation

- As of mid-March, Placer County was nowhere near the threshold for “herd immunity”
- The county is making good progress since vaccination was initiated.
- People who were vaccinated, on average, have much higher antibody titers than people who acquired infection naturally
- Certain subsets of the population, as of mid-March, are not accessing vaccination.
- Specifics of data, but not major thrust, will change as we adjust for county demographics

